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**REMARKS**

**I. Status of the Application.**

Claims 1-20 of the Application are pending. In the Office Action, the Examiner:

(a) Rejects claims 1-20 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention; and

(b) Rejects claims 1-20 under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 4,025,362 to Frauenfeld ("Frauenfeld") in view of U.S. Patent No. 6,578,777 to Bui ("Bui").

In this Response, Applicant amends claims 1, 3, 12, and 14 and cancels claims 8, 10, 17, and 19 to further clarify the invention claimed. Applicant respectfully submits that the foregoing amendments and following remarks incorporated herein overcome the Examiner's rejections to claims 1-20 and respectfully request reconsideration of the pending claims in view of these amendments and remarks.

**II. Applicant's Amendments Do Not Constitute New Matter.**

Applicant respectfully submits that amended claims 1, 3, 12, and 14 are supported by the Application as originally filed. Applicant amends claims 1 and 12 to incorporate the limitations of original dependent claims 8 and 10 and 17 and 19, respectively. As requested by the Examiner, Applicant amends claims 1, 3, 12, and 14 in order for the claims to no longer read on values of zero pressure. Accordingly, Applicant respectfully submits that the amendments to the claims do not constitute new matter and should be accepted.

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**III. The Rejection of Claims 1-20 Under 35 U.S.C. §112, Second Paragraph, Should Be Withdrawn.**

Applicant respectfully submits that the rejections of claims 1-20 under 35 U.S.C. §112, second paragraph, should be withdrawn in view of the amendments to claims 1, 3, 12, and 14. The Examiner found claims 1-20 to be indefinite because it was unclear how the claimed system could operate at a low pressure if the claim language read upon values of zero pressure. (Office Action p. 2). In order to clarify the claimed invention, Applicant amends the claims to specify that the air exits the discharge tube at a pressure "greater than zero pounds per square inch." (Claims 1 and 12). Applicant respectfully submits that this added language clarifies that the claimed invention operates at a low pressure and overcomes the Examiner's rejection of claims 1-20 under 35 U.S.C. §112, second paragraph. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

**VI. The Rejection of Claims 1-20 Under 35 U.S.C. §103(a) As Being Obvious Over Frauenfeld In View Of Bui Should Be Withdrawn.**

Applicant respectfully submits that the rejections of claims 1-20 under 35 U.S.C. §103(a) should be withdrawn because neither Frauenfeld nor Bui, alone or in combination, disclose, teach or suggest all of the limitations of amended independent claims 1 and 12. Three criteria must be met to establish a *prima facia* case of obviousness: (i) there must be some suggestion or motivation to combine the teachings of two or more prior art references; (ii) there must be a reasonable expectation of success; and (iii) "all of the claim limitations must be taught or suggested by the prior art." MPEP §§ 2143 and 2143.03 (citing *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974)).

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Applicant respectfully submits that neither Frauenfeld nor Bui, alone or in combination, teach or suggest all the limitations of independent claims 1 and 12. For example, Frauenfeld in view of Bui does not teach or suggest a "method for cleaning an exposed heat exchanging coil" that includes the steps of "providing a low-pressure cleaning system having . . . a pressure source that creates movement of air . . . and a discharge tube" so that "operating the low-pressure cleaning system . . . cause(s) air to exit . . . the discharge tube at a pressure less than about 50 pounds per square inch but greater than zero pounds per square inch, at a velocity greater than about 180 miles per hour, and a volume of greater than 440 cubic feet per minute", as claimed in claims 1 and 12.

A. Frauenfeld.

Instead of teaching the methods of claims 1 and 12, Frauenfeld teaches the use of both high-pressure washing nozzles 20 and low-pressure washing nozzles 22 that spray a cleaning solution not air, to clean the heat exchanging surfaces of the heat transfer plates of a rotary regenerative heat exchanger. (Col. 2, ll. 16-47). While Frauenfeld terms washing nozzles 22 as "low-pressure", it appears that Frauenfeld is only referring to the fact that the nozzles 22 have less pressure than nozzles 20 because Frauenfeld states that each nozzle is coupled to a cleaning liquid source "for supplying a high pressure cleaning liquid to the cleaning fluid nozzles sequentially in groups of at least one nozzle." (Col. 1, ll. 67-68; Col. 2, ll. 1-2). The method disclosed by Frauenfeld involves utilizing the stream of cleaning solution from high-pressure washing nozzles 20 for a short period of time to loosen the deposits on the heat transfer plates and then utilizing the stream of cleaning solution from "lower energy" washing nozzles 22 for a

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longer period of time to wash away the loosened dirt. (Col. 2, ll. 30-47). Accordingly, Applicant respectfully submits that Frauenfeld does not teach the methods of claims 1 and 12 of cleaning an exposed heat exchanging coil with a low pressure cleaning system that has a pressure source and a discharge tube that causes air under the claimed pressure, at the claimed velocity, and at the claimed volume to remove particles from the heat exchanging coil.

B. Bui.

Applicant respectfully submits that Bui also does not teach or suggest all the limitations of claims 1 and 12. Bui teaches a spray nozzle for use in a gas turbine or oil burner application that produces a uniform spray of small fluid drops from a low pressure supply of air and fluid in order to minimize clogging. (Col. 3, ll. 12-21). Bui does not disclose the pressure that the air and liquid exit the nozzle but rather, only discloses that the air and liquid enter into the nozzle at similar low pressures (e.g., 0.2-5.0 psi). (Col. 5, ll. 1-11). Bui discloses that the spray nozzle prevents clogging by reducing the velocity of the liquid as a result of the impact with wall 24a and then the passage through the larger diameter fluid feeding orifice 25. (Col. 4, ll. 25-40; Col. 5, ll. 31-36). The spray nozzle of Bui also decreases the velocity of the air passing through the nozzle by passing the air through air swirling vanes 36 in order to impart a rotational component of motion to the low pressure air flowing through the nozzle. (Col. 4, ll. 41-61). Thus, Applicant respectfully submits that the method disclosed by Bui is one of utilizing the described spray nozzle to supply a low-velocity uniform spray of small fluid droplets in a gas turbine or oil burner application in order to prevent clogging of the nozzle. Accordingly, Applicant respectfully submits that Bui does not teach or suggest the methods of claims 1 and 12 of

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cleaning an exposed heat exchanging coil with a low pressure cleaning system that has a pressure source and a discharge tube that causes air under the claimed pressure, at the claimed velocity, and at the claimed volume to remove particles from the heat exchanging coil.

C. Frauenfeld In View Of Bui.

The combination of Frauenfeld and Bui fails to teach or suggest all the limitations of the methods of claims 1 and 12. It appears that the Examiner combines Frauenfeld and Bui to replace the low-pressure washing nozzles 22 of Frauenfeld with the spray nozzles of Bui. Irrespective of the reasonable expectation of success or suggestion and motivation to combine these references, such a combination seems to disclose a method of cleaning heat exchanger plates by first using the stream of cleaning solution exiting the high pressure washing nozzles to loosen the deposits and then washing the loosened deposits away with a low velocity, lower pressure spray of cleaning solution that passes through the spray nozzles of Bui. It is noted that neither Frauenfeld nor Bui actually disclose, teach or suggest that the liquid and air that passes through the nozzle of Bui exit the nozzle at a low pressure. Rather, Bui only mentions that the air and liquid enter the nozzle at a low pressure of 0.2-5.0 psi.

Applicant does not dispute that systems like Frauenfeld that use liquid sprayers to clean heat transfer plates and that spray nozzles like Bui are well-known in the art. In fact, Applicant even discusses, in association with Figure 2, on page 6, lines 8-24 of the Application, the use of a spray nozzle like the one disclosed in Bui in order to inject a substance into the discharge tube of the low pressure cleaning system. As discussed in the Application on pages 1-3, the subject invention is not an improvement on such liquid sprayer systems (i.e., Frauenfeld) or spray

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nozzles i.e., Bui) but rather, is an alternative method of cleaning an exposed heat exchanging coil with low-pressure, high velocity, and high volume air in order to prevent the damage caused by liquid sprayer systems. (Application, pp. 1-3). Thus, Applicant respectfully submits that the combination of Frauenfeld and Bui does not disclose, teach or suggest the claimed method of claims 1 and 12 of cleaning an exposed heat exchanging coil by "providing a low-pressure cleaning system having . . . a pressure source that creates movement of air . . . and a discharge tube" so that "operating the low-pressure cleaning system . . . cause(s) air to exit . . . the discharge tube at a pressure less than about 50 pounds per square inch but greater than zero pounds per square inch, at a velocity greater than about 180 miles per hour, and a volume of greater than 440 cubic feet per minute".

The Examiner states that Frauenfeld in view of Bui fails to teach the recited velocity or volume, but for reasons unknown to the Applicant, concludes that it would have been within the level of one skilled in the art to increase the velocity and volume to the claimed levels. (Office Action, p. 4) Applicant respectfully disagrees with this conclusion. The combination of Frauenfeld and Bui does not teach or suggest a method of using low-pressure, high velocity, and high volume air to clean an exposed heat exchanging coil. Rather, Bui states that in order to prevent the clogging of the spray nozzle it reduces the velocity of the liquid that enters the nozzle and makes it clear that the air that passes through the nozzle is reduced in velocity as it passes through multiple air swirling vanes 36 in order to impart a rotational component of motion to the air. (Col. 4, ll. 25-61; Col. 5, ll. 31-36). Accordingly, Applicant respectfully submits that it would not be obvious to one skilled in the art to increase the velocity and volume when the spray

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nozzle of Bui being used in combination with the liquid sprayer system of Frauenfeld, actually, reduces the velocity of the air and liquid passing through the nozzle.

D. No Motivation or Suggestion Exists to Combine the Frauenfeld and Bui References.

Applicant also respectfully submits that there would be no suggestion or motivation to combine Frauenfeld with Bui because modifying the liquid sprayer system of Frauenfeld with the spray nozzle of Bui would render Frauenfeld unsatisfactory for its intended purpose. "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." MPEP §2143.01 (citing *In re Gorden*, 733 F.2d 900 (Fed. Cir. 1984)). Frauenfeld specifies that a high pressure cleaning liquid source is coupled to each nozzle to supply a high pressure cleaning solution to the nozzle. (Col. 1, ll. 67-68; Col. 2, ll. 1-2). Bui specifies that the fluid that enters into the spray nozzle must enter at a low operating pressure (e.g. 0.2-5.0 psi). (Col. 5, ll. 1-11). One skilled in the art would not combine a nozzle that requires that the liquid and air enter into the nozzle at a low pressure with a liquid sprayer system that requires that each nozzle be coupled with a high pressure cleaning liquid source, because the nozzle would not function correctly and would result in the liquid sprayer system of Frauenfeld not cleaning the heat transfer plates. Accordingly, Applicant respectfully submits that no motivation or suggestion exists to combine these references because it would render Frauenfeld unsatisfactory for its intended purpose of cleaning the heat exchanger plates.

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E. Applicant Respectfully Requests That The 35 U.S.C. §103(a) Rejections Be Withdrawn.

For all of the above reasons, Applicant respectfully submits that amended claims 1 and 12 are not obvious under 35 U.S.C. §103(a) over Frauenfeld in view of Bui and requests that these rejections be withdrawn. Moreover, Applicant respectfully submits that claims 2-7, 9, 11, 13-16, 18, and 20 are also not obvious over Frauenfeld in view of Bui because each of these claims depend from either claims 1 or 12, respectively. "If an independent claim is not obvious under 35 U.S.C. §103, then any claim depending therefrom is not obvious." MPEP § 2143.03 (citing *In re Fine*, 837 F.2d 1382, 1385 (C.C.P.A. 1970)). Accordingly, Applicant respectfully requests that the rejections of claims 1-20 under 35 U.S.C. §103(a) be withdrawn and that the Application proceed to allowance..

V. Applicant Petitions for an Extension of Time.

Applicant hereby petitions for an extension of time of two (2) months, under 37 C.F.R. § 1.136(a), thereby extending the deadline for response to Monday, July 25, 2005. Applicant authorizes payment for this extension in the amount of \$225.00 to be charged to deposit account 09-0007. When doing so, please reference the client's docket number of P00755-US-01 (21348.0001).

CONCLUSION

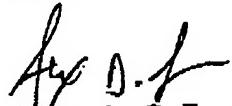
For all of the foregoing reasons, it is respectfully submitted that Applicant has made a patentable contribution to the art. Favorable reconsideration and allowance of this Application, is therefore respectfully requested. In the event Applicant has inadvertently overlooked the need

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for payment of an additional fee, Applicant conditionally petitions therefore, and authorizes any deficiency to be charged to deposit account 09-0007.

Respectfully submitted,

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Date: 7/25/05

Enclosure: Fax Transmittal Sheet